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May 3, 1960

Mr. B. O. Payne
Technical Manager, Research
Cooke, Troughton and Simms Ltd.
Haxby Road
York, England

Dear Mr. Payne:

I am very grateful to you for your letter of April 29th and for your conscientious cautions on the problems we are likely to encounter in ultraviolet microscopy. Perhaps I have been too much aware of the pressure of time and have been trying to leap over too many obstacles at once. In due course it will be urgent to develop a compact and rigid system for ultraviolet microscopy but I think I may have to agree with you that we have more ground work to do first. I had thought of the McArthur Microscope as a tangible and extremely useful prototype on which to build other refinements, especially our system for the collection and transport of the specimens. However, in view of the difficulties which you have indicated, I believe that we may be wiser to separate this problem from that of ultraviolet microscopy itself, which has its own technical questions. If, therefore, you are not yet irrevocably committed to the work needed to produce the objective we discussed, I would ask you to cancel this order until we have had more experience and can discuss a better thought-out design. Meanwhile, I will be submitting an order for a modified McArthur Microscope, similar to the one proposed, but equipped with glass optics so as to simulate what wemay hope to do later.

In addition, as a separate line of work, we will be studying the techniques of ultraviolet microscopy as a separate item, and wait to combine these lines until we have ironed out the bugs of each of them. I am particularly anxious to try the newly advertised Zeiss Achromats before making a final conclusion.

I'm very sorry we did not get an opportunity to meet in London when you visited but as you know this was coincident with my own departure. I hope that as we get into the problem you will not feel unduly burdened if we discuss some of its tangible details with you. Perhaps when we have a better grasp of it a more fundamental reappraisal of the approach will be in order.

I have been experimenting with some reflecting optics, on loan from the Bausch & Lomb Company, with more or less satisfactory results. As you well know the problem of arranging a satisfactory

source of UV at 254 mμ is not an easy one and the mercury arc furnished with the B & L monochromater is not altogether satisfactory at wave lengths less than 300 mμ. We have had passingly good success with a low pressure mercury discharge lamp of relatively low luminosity but whose output is mainly at the 254 line. This was filtered as described by Lipkin et al 1959, J.A.C.S. 81:6077. We are thinking now of collecting the light from a more extensive source of the same kind by means of a concave mirror focused on a dispersing screen for Kohler-type illumination. Have you any critical thoughts on such a method of securing a higher intensity of 254 illumination?

Yours with many thanks,

Joshua Lederberg
Professor of Genetics